AMMONOOSUC VALLEY
WETLAND MITIGATION BANKING
FEASIBILITY STUDY

North Country Council
with assistance from
Lobdell Associates Inc.
September, 2001

Preface

In early 2000, the North Country Council (NCC) was awarded a grant from the New Hampshire Department of Environmental Services to investigate the feasibility of developing a wetlands bank in a portion of the Ammonoosuc River watershed. Later that year, NCC formed an advisory committee composed of local residents from area towns and personnel from several state and federal agencies involved in wetland permitting and protection. Additionally, Lobdell Associates Inc., of Landaff was engaged to assist in the technical aspects of the project.

This report represents the results of this one year effort. The local advisory committee met four times while the full advisory committee met at the beginning of the process and after the release of the draft report.

The contents and recommendations do not necessarily reflect the official view of the North Country Council or the New Hampshire Department of Environmental Services.

Please note there are a number of technical and specialized terms used throughout this report. It may be helpful to refer to the Glossary on page 41.

WETLAND BANKING ADVISORY COMMITTEE PARTICIPANTS AND INVITEES

First	Last	Town	State	Agency/Affiliation
David	Wood	Bethlehem	NH	Board of Selectmen,
Peter	Walker	Concord	NH	NH Wetlands Bureau
Doug	Thompson	Boston	MA	US Environmental Protection Agency Region 2
Jamie	Seidel	Woodsville	NH	USDA-Natural Resource Conservation Service
Charlie	Niebling	Concord	NH	Society for the Protection of New Hampshire Forests
Bill	Neidermyer	Concord	NH	US Fish and Wildlife Service
Phillip	Morrisson	Concord	NH	US Fish and Wildlife Service
Paul	Minkin	Concord	MA	Regulatory Division, US Army Corps of Engineers
Paul	McGoldrick	Littleton	NH	Littleton Industrial Development Corporation
Ellse	Lawson	Bethlehem	NH	Conservation Commission
Francesca	Lataweic	Concord	NH	Office of State Planning
Ken	Kettenring	Concord	NH	NH Wetlands Bureau
Mark	Kern	Boston	MA	US Environmental Protection Agency Region 1
Walter	Johnson	Lisbon	NH	Administrative Assistant
Jason	Hoch	Littleton	NH	Littleton Economic Development & Planning Office
Bill	Hauser	Concord	NH	NH Department of Transportation
Dayton	Goudie	Landaff	NH	Trout Unlimited
Glenn	English	North Haverhill	NH	Town Manager
Rich	Cook	Concord	NH	Audubon Society
Frank	Clark	Lisbon	NH	Conservation commission
Rebecca	Brown	Sugar Hill	NH	Conservation Commission
Woody	Argereow	Bath	NH	Citizen
Tanya	Tellman	Bethlehem	NH	Bethlehem Conservation Commission
Bruce	Kohler	Bethlehem	NH	Trout Unlimited
John	Severance	Whitefield	NH	Whitefield Conservation Commission

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REPORT OVERVIEW

This document is the report of North Country Council's effort to evaluate the feasibility of creating a wetland bank for an area of the Ammonoosuc River watershed which includes the towns of Bath, Bethlehem, Franconia, Haverhill, Landaff, Lisbon, Littleton and Sugar Hill. Although at least 300 wetland banks exist nationwide, there are none in New England. The pending mitigation rules proposed by the NH Wetlands Bureau make this an opportune time to consider a wetland bank in New Hampshire.

A mitigation bank is a site where wetlands have been created, restored, enhanced, or preserved for the purposes of providing required regulatory mitigation for one or more projects impacting wetlands. Wetland mitigation banking almost always involves "off-site" mitigation that is not at the site of the wetland impacts. Wetlands banking provides an alternative to many small, onsite, poorly constructed individual compensatory mitigation projects. Wetland banks can place a large amount of wetland mitigation in one place and that place can be ecologically superior to many small on-site mitigation areas. Advantages to regulatory and resource agencies include increased efficiency of review and compliance monitoring for mitigation projects. However, there have been many problems and issues associated with banks including acceptance by regulators, measuring success, timing of bank credit release, wetland credit ratios and the complexity of federal banking approval.

This report defines wetland banking and the various types of banks. It addresses the issues and problems that bank creators have faced and the specific regulatory climate here in New Hampshire. An analysis of the study area's historic wetland permitting shows the need for about 14 acres of mitigation credits for a projected 10 year span, based on the NH Wetland Bureau's proposed mitigation ratios and straight line growth projections.

A financial analysis shows a range of projected costs for producing 14 mitigation credits from $11,000 to $65,000 per credit, depending on a number of variables, but primarily the high cost of constructing created wetlands versus the cost of establishing upland buffers.

The report concludes that a mitigation bank for the Ammonoosuc River Valley is feasible, but only if federal, state, and local interests work together to make it happen. Circumstances that would make a bank's success more likely include: adoption of the proposed New Hampshire mitigation rules, targeting of those projects that are covered by the New Hampshire Statewide Programmatic General Permit, increased NH Wetlands Bureau mitigation compliance monitoring, and the use of mitigation credits at the time of the applicant's wetlands permit approval.

Locally, a new wetland banking non-profit organization should eventually be formed which would further the effort and develop a communication with the NH Wetlands Bureau as to the framework they would require to start a bank. The next work items would be to identify a bank site and develop a budget.

1. INTRODUCTION

Wetland banks, which will be defined and discussed in the next section, are directly connected to wetland permits. Without the need of a wetlands permit, and specifically the need to mitigate wetland impacts in order to obtain a wetlands permit, there would be no wetland banks.

Since 1969, anyone impacting wetlands in New Hampshire has needed a permit from the State of New Hampshire. Since 1972 and passage of the Clean Water Act, a permit from the US Army Corps of Engineers (Corps) has also been required in many cases.

Since the late 1980's, to obtain a permit to dredge or fill wetlands from the New Hampshire Wetlands Bureau (formerly the New Hampshire Wetlands Board), the applicant has had to first mitigate the impacts. Mitigation requirements generally follow a specific sequence:

- NEED: Show that there is a need for the proposed wetland impact.
- AVOIDANCE: Take all practical steps to avoid adverse impacts and consider alternatives.
- MINIMIZATION: Minimize unavoidable impacts and look at lesser impacting alternatives..
- COMPENSATION: Compensate for permanent destruction of unavoidable wetland impacts by restoring degraded wetlands or by creating a new wetland.

In New Hampshire, compensating mitigation of impacts is not considered until need, avoidance, and minimization requirements are met. Several chapters under the New Hampshire Wetlands Bureau (NHWB) rules contain standards and criteria for assessing avoidable impacts. Chapter 302.03, Avoidance and Minimization, requires permit applicants to submit a statement describing the impact of the proposed project and provide evidence which demonstrates that there is no alternative with less wetland impact. Chapter 302.04 requires the demonstration of need and least impacting alternative.

However, until 2001, the NHWB had no written policy on mitigation , except for prime wetlands, which represent a small portion of wetlands in the state. Decisions on projects involving restoration or creation were made on a case by case basis. The applicant generally would submit what they considered an adequate mitigation plan and the NHWB staff would either accept, reject or request modifications to it. The amount of mitigation was a negotiated amount. No standards existed as to how much mitigation was enough or what type of mitigation was acceptable.

Types of Wetland Mitigation

- ***Avoidance***
- ***Minimization***
- ***Enhancement of Existing Wetlands***
- ***Compensatory Mitigation: Creation, Restoration, Preservation***
- ***Wetland Banks***
- ***In Lieu Fees***

Once it was determined that the amount of wetland impact is unavoidable, then compensatory mitigation for that impact comes into play (Compensatory mitigation is compensation for the impact by replacing or providing substitute resources). There are a wide variety of options . Generally, in New Hampshire, compensatory mitigation has been required to be "on-site" (e.g. on the same lot as the impact), either through creation or restoration of a wetland or preservation of a wetland buffer. The type of habitat created or protected may or may not replace the habitat or wetland type impacted, based on what is feasible or practical at that particular site. For example, the majority of wetlands in New Hampshire are forested but forested wetlands are difficult to create so other wetland types are sometimes substituted for mitigation. Additionally, creation is often more likely than restoration, only because there is no wetland on the site that needs restoring.

Once a mitigation plan is accepted and the permit granted, the mitigation could then take place. Mitigation generally occurs concurrently with project construction unless permit conditions specify otherwise. The permit conditions can also specify what constitutes successful mitigation. Often it is related only to easily measurable features, such as plant survival rates. For example, a condition may be that 75% of the wetland vegetation must be surviving at the end of three years in order for the mitigation to be considered a success.

Finally, monitoring of the mitigation site may be required by a wetland scientist. This would include a site visit, photographs, and an assessment as to whether the mitigation was completed as planned. These reports may be yearly for up to five years.

This year, the NHWB drafted a set of mitigation rules, Chapter Wt. 800, which established for the first time a clear set of standards for compensatory mitigation for all projects impacting over 10,000 square feet. (see Appendix A). The rules establish mitigation ratios based on the type of wetland resource impacted and the form of mitigation planned, as shown in Table 1. For example, if the impact is to be 1.0 acres of forested wetland and wetland creation was to be the mitigation, then 2.0 acres of wetland would have to be created. The rules also spell out a variety of adjustment factors and other necessary criteria.

It should be noted that the ratios for restoration in all impact types are less than that for creation. This reflects the concern nationwide that created wetlands will not generally function as well as restored, natural wetlands. Also of note is that upland buffers and wetlands within buffers (contiguous jurisdictional areas) can be used for mitigation. This is not the case in many states. Also, federally permitted wetland impacts are usually mitigated by creation or restoration of wetlands and can only be mitigated by preservation as part of a wetland bank. Recent research has shown that preserving the upland buffer adjacent to a wetland or stream can play a vital role in enhancing several wetland functions including water quality and wildlife habitat (2)*. The new rules recognize this connection.

** Number in parenthesis refers to reference in bibliography*

Table 1
Proposed New Hampshire Mitigation Ratios

Resource Impacts	Creation In-kind	Restoration In-kind	Preservation of Upland Buffer	Incorporated Jurisdictional Area
Bog	N/A	3:1	20:1	40:1
Tidal Marsh	5:1	3:1	20:1	40:1
Other tidal	3:1	2:1	15:1	30:1
Forested	2:1	1.5:1	10:1	20:1
Vernal Pool	See Wt. 801.07	N/A	See Wt. 801.07	See Wt. 801.07
Undeveloped Tidal Buffer Zone	N/A	2:1	10:1	20:1
All Other Jurisdictional Areas	1.5:1	1:1	10:1	20:1

Federal Mitigation

In 1992, the U.S. Army Corps of Engineers issued a New Hampshire State Programmatic General Permit (NHSPGP) in order to eliminate redundancy in wetland permitting-applying for two wetland permits for the same project. This will be discussed further in Section 5.

With regard to mitigation, federal permitting is similar to state permitting in that need, avoidance, and minimization must also take place prior to compensatory mitigation. Where compensation is required, both the Corps and EPA prefer the same kind of wetlands to be created on the same site as the one being lost. For example, if a developer applies for Section 404 permit to construct a mall and four acres of a freshwater marsh wetland needs to be filled and cannot be avoided, the developer usually must construct four acres of freshwater marsh somewhere on the site. However, offsite mitigation may also be considered.

In New Hampshire, this is an opportune time to be considering establishment of the first wetland mitigation bank in New England. First, the new mitigation rules will now require mitigation for everyone equally and with a known mitigation standard. Secondly, mitigation banking has had many years of trial and error nationwide and is now accepted by regulators as a reasonable alternative to on-site mitigation.

2. WHAT IS A WETLAND BANK?

A mitigation bank is a site where wetlands have been created, restored, enhanced, or preserved for the purposes of providing mitigation for one or more wetland permits. Wetland mitigation banking almost always involves “off-site” mitigation that is not at the site of the wetland impacts. Using a market approach, a third party (mitigation banker) develops a wetland bank which typically has created or

restored wetlands within it. These wetlands once established and functioning, can then be sold as wetland credits to anyone who requires compensatory wetland mitigation as part of a wetland permit. The banked land would continue to be held and maintained by the banker to conserve the wetland in perpetuity. The bank would have to first be approved by the regulatory agencies for which the mitigation is to be required.

A mitigation bank is not like a checking account. Credits placed in deposit by a sponsor can only be spent by a user if the regulator approves the action. This means that the applicant must first meet the requirements for need, avoidance, and minimization. The regulator also approves the amount of credits available and the time of withdrawal.

However, banking does provide an alternative to many small, onsite, poorly constructed individual compensatory mitigation projects. Wetland banks can place a large amount of wetland mitigation in one place and that place can be ecologically superior to many small on-site mitigation areas. Also, mitigation for the cumulative impacts of many small wetland losses within a watershed can be more easily accomplished through a wetland bank.

Advantages to regulatory and resource agencies include increased efficiency of review and compliance monitoring for mitigation projects. This increase in efficiency improves the reliability of efforts to restore, enhance, or create wetlands for mitigation purposes.

Advantages of Mitigation Banks *(14)*

- Provide an opportunity to locate restored or created wetland in areas of greatest need in the watershed.
- Bring scientific and planning expertise and financial resources together, thus increase the likelihood of success.
- Consolidate numerous small, isolated wetland mitigation projects into one large block of created, restored or enhanced wetlands (one well site 50 acre marsh with a wide variety of wildlife habitats vs. 50 one acre wetlands adjacent to shopping malls and condo developments
- Make mitigation implementation and enforcement easier to verify for regulators -one managed site rather than many small-unmanaged sites
- Developer no longer directly responsible for mitigation implementation, maintenance or monitoring. Economical mitigation solution.
- Create a more valuable mitigation site by having it located in the best location: adjacent to existing wetlands, adjacent to waterbodies, connecting two important wetlands, buffer existing wetlands.

While banks vary, most have several common functions:

Permitting

Without the need for a permit to impact wetlands, banks would not exist. The bank provides an acceptable method of mitigating wetland impact.

Credit Production

The bank's only product is wetland mitigation credits. Thus the bank has to develop those credits by an acceptable method, generally creation, restoration or preservation. The bank serves as the third party between the regulatory agency and the permittee.

Use of Credits

The bank exists solely to sell credits to wetland permitee (or client). This client has or is seeking a permit to impact wetlands and will use the bank if it meets their economic, timing or other needs. It is to the benefit of the bank to maximize the value of the credits while the client's is to minimize them from an economic standpoint. Ultimately, the regulatory agency determines the amount of credits available at any given bank.

Long-term Property Ownership

The mitigation area should perform its function theoretically in perpetuity, including management, and to exclude other uses of the land once the mitigation credits have been utilized.

Bank Establishment and Management

Decisions have to be made as to what credits will be produced and to whom they will be sold. Additionally, and just as important, is the determination of at what cost the credits will be sold and how the creation of credits will be financed. In other words, the business side of the bank.

There are several phases in establishing a bank, which include:

Feasibility assessment and preparation of plan

Permitting of bank-approval to operate from agencies including determination of credit availability and standards for bank success

Implementation of plan at one or more bank sites

Sale of credits

Long-term management

There are at least three players in a wetland bank:

The Regulator

- Approve bank and bank structure through an agreement or memorandum of understanding (MOU)
- Approve service area of bank-where bank credits can be used
- Approve bank's site plan
- Approve credit availability
- Approve timing of distribution credits
- Approve use of bank by permittee
- Approve reporting standards and monitoring actions

The Bank Owner

- Secure all necessary permits at the federal, state, and local level
- Identify bank sites
- Finance construction, operation, and maintenance of bank
- Construct bank
- Sell Credits
- Provide long-term bank management
- Submit necessary monitoring reports to regulators

The Wetland Permittee (Bank User)

- Arrange with regulators for use of the bank to mitigate their wetland impacts
- Purchase bank credits
- Provide funds for monitoring and long-term management

The permittee also realizes advantages, including economy of scale and improved cost estimates. Instead of a developer creating and maintaining a wetland, something they are not trained to do, the bank takes over that responsibility for them. A mitigation banking approach offers an opportunity of greater economies of scale at all stages: planning, construction, and operation of replacement wetlands (1).

There are three kinds of banks:

- **Single Use Banks –** the most common. The bank's owner is also its principal client and is often established by a public agency that has multiple projects over a period of years which will impact wetlands. The agency (or private company) creates a wetland bank from which it withdraws credits later on for a number of projects. Nationwide, state departments of transportation have many of these.

- **Joint Project Banks -** Cooperative ventures by two or more sponsors, at least one of which is a public entity (Operate much like single use banks)

- **Public Commercial Banks -** Often sponsored by public/non-profit entities and used to compensate for wetland losses in a defined service area. May have multiple private and public users. Often used to implement regional or area-wide development plans.

- **Private Commercial -** Entrepreneurial banks sponsored by private entities, who acquire bank sites, price credits, and sells them to clients. Figure 1 is an example from the website of one of this type of banks.

Federal Mitigation Banking

The federal government generally supports the use of mitigation banks to provide compensatory mitigation for projects needing federal permits, provided need, avoidance and minimization have been accomplished and on site mitigation is not feasible. Several Corps, EPA, and US Fish and Wildlife regional offices have drafted guidelines for establishment of wetland mitigation banks. Under agreements with the federal agencies involved, no wetland bank can be used to compensate federally jurisdictional wetland impacts without the bank first being federally accepted.

In 1995, several federal agencies issued guidance regarding the establishment, use and operation of wetland banks described in the document, "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks. Memorandum to the Field" (see Appendix B).

Prospective bank sponsors first submit a prospectus to the Corps to initiate the process. The banker must develop a "mitigation banking instrument" to gain concurrence from federal agencies on the objectives and administration of the bank. Table 2 provides a list of the information needed to be provided in the instrument.

Figure 1
Example of a Commercial Wetland Bank

WETLAND ENVIRONMENTAL TECHNOLOGIES

6520 Powers Ferry Road - Suite 110 - Atlanta, Georgia 30339 - Telephone: (770) 541-4200 - Toll Free: (888) 779-4WET(4938) - Facsimile: (770) 541-4210

How to Use the Monastery Mitigation Bank To Meet Your Compensatory Mitigation Requirements

1. **Determine impact to wetlands.** With the assistance of your engineer/consultant. Delineate the wetlands area within your project area and determine the extent of unavoidable wetlands impact.

2. **Complete the compensatory mitigation impact (SOP) Worksheet.** After your engineer/consultant has determined the extent of the unavoidable wetlands impact, your engineer/consultant will complete the SOP worksheet. At this point, you will know the number of mitigation credits required for your proposed impact.

3. **Call WET for a quote.** Wet will provide you with the mitigation cost. You may reserve the required credits with a refundable deposit of ten percent (10%) of the purchase price of the required credits.

4. **Develop off-site mitigation proposal.** After determining the extent of unavoidable wetlands impacts at your site, your engineer/consultant will develop an "off-site" proposal for your project, including use of credits from the Monastery Mitigation Bank.

5. **Determine ecological benefits of off-site mitigation.** Your engineer/consultant will establish that off-site wetlands mitigation is more ecologically beneficial than on-site mitigation. This is easy to substantiate because the Monastery Mitigation Bank property is free from the negative impacts of surrounding development and is located on an existing 500-acre contiguous wetlands environment already permitted and approved for mitigation.

6. **Submit your mitigation plan to the Corps of Engineers.** Include the following in your mitigation plan 1) the SOP worksheet; 2) a description of the ecological benefits for using off-site mitigation for your property; and 3) information about your intention to use the Monastery Mitigation Bank. If the Corps of Engineers denies your permit submittal, we will return the deposit. If your permit is approved, we will issue you a credit certification upon payment of the balance.

Table 2
Federal Mitigation Banking Instrument/Document
Required Components

Bank Goals and Objectives	Ownership of bank lands
Bank size and wetland types	Description of baseline conditions
Geographic service area	Resource suitable for compensation
Methods for determining credits and debits	Accounting procedures
Performance standards	Reporting and monitoring plan
Contingency/remedial actions/responsibilities	Financial assurances
Compensation ratios	Long-term management/maintenance.

A Mitigation Bank Review Team (MBRT) is formed to review the instrument. The interagency team includes the bank sponsor, representatives from the Corps, EPA, FWS, NMFS, and NRCS, as appropriate, as well as state and local regulatory and resource agencies. After review and public comment, those who agree with its terms may sign the instrument. In most cases, the Corps will then approve the bank's formation and its ultimate use on a project specific basis.

As can be seen from the information required in Table 2 and the number of different agencies and goals represented on the MBRT committee, establishing a wetland bank for federal mitigation can be a costly and lengthy process. Additionally, once the bank is established there is no guarantee that you can use the credits for any particular project. And unlike New Hampshire’s new mitigation ratios, credits for upland preservation and wetland buffers can only be given in certain circumstances and after a number of conditions are met (see Appendix B, Section IIB, 4-5). This is an important point relative to the feasibility of an Ammonoosuc River Valley Bank and will be discussed in Section 7.

Wetland Bank Site Selection

Of all the factors which make or break a wetland banking project, either economically or environmentally, selecting the bank site is the most critical. The wrong site can result in the cost of creating the credits too high to make them marketable. It could also result in the regulators not approving the site because of its low environmental value and its high risk of long term success.

Table 3 lists some of the factors to consider during site selection. A site that has disturbed or filled wetlands present may offer opportunities for economic restoration, while a site that has permeable soils and a very deep watertable may make wetland creation extremely expensive. Knowledge of the service area is critical to allow for the bank to be located where it will provide the most environmental benefit and mitigate the anticipated impacts. If the site is, or is adjacent to, a unique or important natural resource or an existing conservation area, it may be more valuable. A major cause of bank failures is nearness to incompatible uses (14), such as a 10-acre bank next to a 100 acre parking lot.

Table 3
Mitigation Bank Site Selection Considerations

- History of Land Use
- Ecology of the site and area
- Hydrology
- Soils present
- Regional relationships to surface water and wetlands
- Relationship to wildlife habitats
- Presence of rare or endangered species
- Surface and groundwater quality
- Size
- Uniqueness
- Ownership
- Ownership and use of adjacent parcels

It is critical to involve the regulators early in the selection process to be certain that any site meets their approval. Sections 6 and 7 discuss some of the site selection issues relative to the study area.

History of Mitigation Banking

Wetland mitigation banking is a relatively new idea. The first bank was established in Louisiana in 1984. In 1988 a study by the US Fish and Wildlife Service found that 13 banks were approved around the country. By 1992, 46 banks had been established in 17 states, mostly in California and Florida. These states lead the way primarily because of a willingness to experiment by regulators (14). Most of these early banks were established to serve just one user-generally state highway departments, port authorities etc; with a purpose of providing mitigation for public projects.

Since then the number of banks has increased dramatically. Today, there are over 230 banks operating in at least 34 states, as shown in Table 4 (23). The 230 banks operate between 370 and 400 individual bank sites; approximately 50% of these are for general use (i.e. not one-user banks).

Table 4
Existing Mitigation Banks

State	Number of Banks	State	Number of Banks	State	Number of Banks
NJ	5	IN	2	ND	3
VA	13	KY	3	SD	1
MD	3	TN	5	WY	1
PA	3	MN	2	CO	8
SC	12	WI	5	OR	3
NC	5	AR	2	WA	2
MS	6	MO	4	ID	3
AL	3	LA	36	NV	1
FL	33	TX	9	CA	21
GA	12	OK	1	UT	2
IL	13	NE	1		
OH	6	MT	1		

Source: IWR, USACE, 2000

In New England, there are no mitigation banks up and running nor does the NE Corps of Engineers or any state agency have a MOU with any entity in New England. There are many reasons for this. Many regulators feel that banking is still experimental. Other concerns include: fear of potential misuses (once a bank is established, then the issue of avoidance, providing need and other mitigation strategies will be lessened), uncertainties of the ability to create and restore wetlands, the inadequacy of credit evaluation techniques, the need for long-term monitoring, administrative and legal complexities, etc.

The status of wetland mitigation in each of the other six New England states follows:

Connecticut- Wetland permitting is at the local level with no state run regulatory program. State statutes allow for mitigation through restoration, enhancement, and creation. No wetland banks exist and there are limited opportunities for future bank creation (22).

Maine-Compensatory mitigation is allowed and can include restoration, enhancement, creation or preservation. Mitigation ratios range from 1:1 for created wetlands to 8:1 for preservation. Maine is in the process of approving a single user bank with the Maine Department of Transportation with 60% of the credits available the first year. The bank will not be used to meet federal mitigation requirements. (8)

Massachusetts- In 1995, Massachusetts published a report entitled, “Wetland Mitigation Banking in Massachusetts” by an interagency advisory committee which recommended implementing two or more wetland banking projects based on a watershed approach (15). No banks, however, have been established.

Rhode Island- No formal compensation ratios and has no plans for mitigation banking in the near future. (16)

Vermont- Compensation may only be considered as a mitigation measure if the applicant has demonstrated first that avoidance, minimization, and restoration are not practical alternatives. No ratios exist and there is no banking planned and none anticipated due to a low rate of development and little mitigation demand. (19)

New Hampshire-

In New Hampshire wetland banking is not addressed in the statutes or the rules. However, it has been discussed at several levels by different agencies. The NH Department of Transportation developed a "Wetland Banking Action Plan" in 1992 with the following objectives: 1. Establishing a statewide inventory of potential wetland banking sites categorized by watershed or some other environmentally appropriate distinguishing characteristic; 2. Developing a pool of demonstration projects for wetland banking, incorporating any or all of the wetland mitigation approaches endorsed by resource agencies associated with a proposed transportation project; 3. Monitoring and analyzing over the long-term the results of the demonstration wetland bank and; 4. Developing and implementing a long-range, on-going wetland banking program (20). In 1996, a draft interagency agreement for wetland mitigation banking was developed between NHDOT and a number of state agencies, federal agencies, and environmental groups. The NHDOT would conduct a statewide inventory to identify potential sites, based on their 10-year plan for highway projects. The bank would be used as compensatory mitigation for those wetland impacts that were needed and could not be avoided. The first attempt to establish a bank under this agreement was in the I-93 corridor between Salem and Manchester for planned future improvements. Four potential restoration/enhancement sites were identified and eight preservation sites in nearby towns. A Mitigation Bank Review Team (MBRT) was established including representatives from state and federal agencies including: NH Wetlands Bureau, NH Fish and Game Department, NH Department of Environmental Services, US Army Corps of Engineers, the Federal Highway Administration and the US Fish and Wildlife Service. The bank would be owned and operated by the NH Department of Transportation with credits being issued on an acreage-based ratio.

The NHDOT proposed a 4-phased issuance of banking credits by the MBRT, with 25% initial credit for the approved banking instrument, construction approval, acquisition of land and actual construction; 25% when the hydrology had been established and vegetation planted; 25% when the vegetation had met survival requirements; and the final 25% when the wetlands in the bank were functioning as planned (18). This scenario was not acceptable to all the federal agencies involved. Some wanted no credits to be made available until the bank was completed with all wetlands constructed and 100% functioning. This was unacceptable to NHDOT. The issue was not resolved satisfactorily and the proposed bank was never established. However, the agency remains a strong supporter of banks and hopes to develop them in the state in the future (9).

3. ISSUES AND PROBLEMS TO BE FACED

Obviously, organizing a bank in the region will be challenging. Nationwide, wetland banking has faced and continues to face obstacles. Some of these obstacles have been insurmountable in some cases resulting in aborted attempts to form banks. For some the number of unknowns and variables made the risk too high. For others the up-front costs and risks were greater than the environmental gains projected. Obviously, with banks now in 34 states, these problems are being successfully overcome in some areas, but not in New England. Several issues discussed by Lindall Marsh in the publication "Mitigation Banks" are summarized below (14):

- **No Guarantees**

All players need assurances. Potential bankowners seek assurance regarding the availability of a market for credits. Regulators need assurances that banks will perform as promised and that a bank's wetlands will be preserved in perpetuity. A bank will most likely be required to carry mitigation to a higher environmental level than is currently being accomplished at individual sites. This may cost more per mitigation credit than for an individual developer who does only a mediocre job at their mitigation site. The bank may not survive if it is selling a product that the regulators do not require of everyone.

- **Performance Standards**

Many permits for on-site mitigation contain few performance standards. They often do not require specific construction plans, monitoring reports or re-construction if found to be providing less mitigation than planned. Banks are subject to controls and standards that individual developers may be able to avoid.

A 1997 study of mitigation in New Hampshire found that many required on-site mitigation projects were not completed and required monitoring was not performed in more that 50% of the cases (3).

- **Timing of the Credit Release**

Many wetland values and functions will not be fully replaced or restored until the created wetland is fully established, which could take over 15 years depending on the type of wetlands. When, then, can a bank begin selling credits: as a wetland is being constructed, when the work is completed, or when the created wetland is considered successful? If a bank has to expend thousands of dollars on wetland creation or restoration, then have to wait 5 years or more to sell the credits, the economics may be insurmountable. This issue was a substantial impediment to NHDOT's banking effort several years ago.

- **Criteria for Success**

What criteria should be used to determine whether a wetland has been created or restored successfully: For most on-site mitigation efforts, simple standards for performance are required, for example, 80% of

the site covered with wetland vegetation after three years. Typically, after a few years, the permittee has no further obligation to maintain the wetland function. Will a bank be treated the same way?

- **Location**

It appears as though the standards for wetlands created in mitigation banks will be more stringent than for wetlands created on-site. Federal regulations currently favor on-site replacement of wetlands over off-site. Under what circumstances would a permit applicant be able to purchase credits from a mitigation bank, rather than create a wetland on-site? Moreover, regulators prefer that created wetlands be located in the same watershed as the destroyed wetlands which means that bank owners must somehow anticipate where future wetland losses will occur in order to establish a bank in the same watershed.

- **Long-Term Maintenance**

Over time, many created or restored wetlands require periodic maintenance or remedial work-supplementary planting, weed control, sediment removal or regrading slopes. How long will mitigation banks have to be maintained? Who will pay for long-term maintenance? Many bank owners plan on donating their land to a nonprofit organization once all credits are sold. Should banks be required to establish a fund for long-term monitoring and maintenance?

- **Exchange Ratios**

If a created wetland is equal in value and function to a filled wetlands then the exchange ratio should be 1:1, that is, one acre of a created wetland exchanged for one acre of filled wetlands. But to hedge against the risk of failure or to account for the difference in values, regulators sometimes require ratios greater than 1:1, say 2:1 or 3:1. The exchange ratio alone could determine whether a bank is profitable or not. See the proposed New Hampshire ratios in Table 1.

- **Wetland Type**

Driven by economics, bank owners will likely create wetlands that are easy and cheap to build and maintain. As a result, wetlands that are relatively easy to create, such as marshes, will predominate at the expense of those that are more difficult to create, such as a red maple swamp and bogs.

- **Complexity and Cost of Obtaining Federal Approval For Bank.**

As seen in Section 1, obtaining approval for a wetland bank that can be used to mitigate a federally permitted project requires a substantial amount of time, technical expertise and upfront money. Additionally, if on-site mitigation is preferred and upland buffers or wetland preservation are deemed unaccepted at the federal level, then most mitigation will be created wetlands, which is the most expensive and risky form of mitigation.

Section 7 of this report contains the recommendations for resolving many of these issues in the study area.

4. THE AMMONOOSUC VALLEY WETLAND BANK STUDY AREA

Population and Land Use

The study area includes eight towns in the lower Ammonoosuc River watershed, as shown in Figure 2 and Table 5. The total area is about 240,000 acres with a resident population of 17,000 or 45 persons per square mile. The Towns of Haverhill and Littleton, however, are only partially in the Ammonoosuc River watershed, with portions of the towns draining into the Connecticut River Basin either directly or via another watershed.

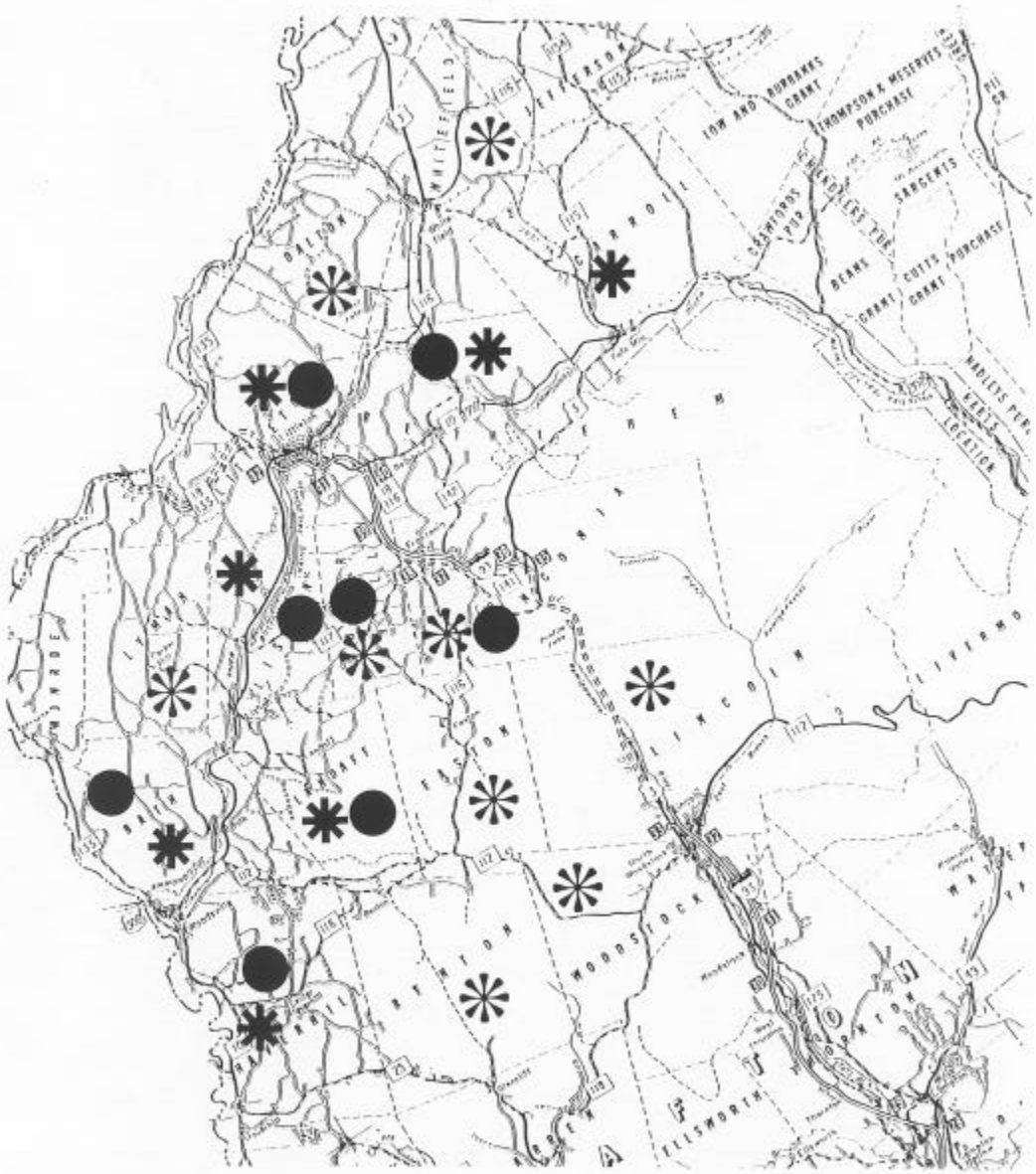
The area is rural with the largest town being Littleton. Economic activity in the area includes manufacturing, tourism, forestry, and services. Franconia, Bethlehem, and Landaff have substantial areas within the White Mountain National Forest. Sugar Hill, Bethlehem, and Franconia include second home and tourist facilities. Haverhill and Bath have substantial lands still in agriculture while Littleton and Woodsville serve as the area retail centers. At about 4.5%, the population growth since 1990 has exceeded expectations, with the recently released 2000 population figures greater than the 1994 NH Office of State Planning projected population for the year 2015.

Table 5
The Study Area

Town	Population (2000)	Size (acres)	Conservation Lands (acres)	Percent of Town in Conservation Lands	Net Non-Conservation Lands (acres)	Wetland Soils (acres)	Percent of Town Wetland
Bath	893	24684	292	2	24392	2032	8
Bethlehem	2199	58206	33173	57	25033	4162	17
Franconia	924	42124	30834	73	11290	1420	13
Haverhill	4416	33511	2919	9	30592	3230	11
Landaff	378	18223	5311	29	12912	1037	8
Lisbon	1587	17066	120	1	17054	777	5
Littleton	5845	34806	165	1	34641	3026	9
Sugar Hill	563	11028	1103	10	9925	843	8
Total	16805	239648	73918	31	165730	16527	10

Land use has changed in the study area over the past several decades, with the amount of agricultural land decreasing and forestland and developed land increasing. Forestland is by far the largest land use with over 85% forested. Agricultural land occupies less than 10%. The amount of developed land is increasing for both residential and commercial uses. It is estimated that about 5% of the area is developed, with much of the development being along the Ammonoosuc River, particularly the older

Figure 2
Towns in The Ammonoosuc River Watershed



● **Towns in the Study Area**
✱ **Towns through which the river flows**
✱ **Other towns within the watershed**

village areas such as Littleton, Lisbon and Woodsville. Newly developed commercial activity is located along Route 302, which parallels the Ammonoosuc River for most of its length. Former agricultural land has become developed and much of this development is also occurring within the 100-year floodplain.

Land use is primarily controlled by local communities. The types of land use controls presently in place are shown in Table 6. Generally, towns in the northern part of New Hampshire do not have the level of control in place of towns in the more urbanized southern portions of the state.

Table 6
Land Use Regulations in the Study Area

Town	Con. Comm	Master Plan	Natural Resource Inventory	Prime Wetlands Study	Zoning	Wetland Zoning	Flood Insure Prog.	River/Shore Zoning	Site Plan Review
Bath	Yes	1987	No	No	1990	1989	Yes	No	
Bethlehem	1970	1993	No	No	1988		Yes	No	1992
Franconia	Yes	1994	No	Yes	1994	1991	Yes	No	1975
Haverhill		1981	No	No	1989*	1996	Yes	No	
Landaff	1988	1985	No	No	1989	Yes	No	No	Yes
Lisbon	Inactive	1992	No	No	1994	No	Yes	No	1992
Littleton	1989	1987	Planned	Yes	1996	No		Partial	Repealed
Sugar Hill	1970	1993	Planned	No	1996	1994	Yes	No	1988

Source: NH Office of State Planning, Town Offices; * Wetland and Floodplain Zoning only.

With regard to future growth, particularly commercial and industrial, most of it will most likely occur in the river valleys, since these areas offer much of the flat, upland areas for development that are adjacent to either Route 302 or I-93, even though they are often within the 100-year floodplain and lie over aquifers. As Table 7 shows, most of the land within 250 feet of either the Ammonoosuc or Gale Rivers is either unzoned or zoned for intensive uses such as industrial or commercial, which could have a significant impact on the ecology of the valleys.

Figure 3
Ammonoosuc River Watershed

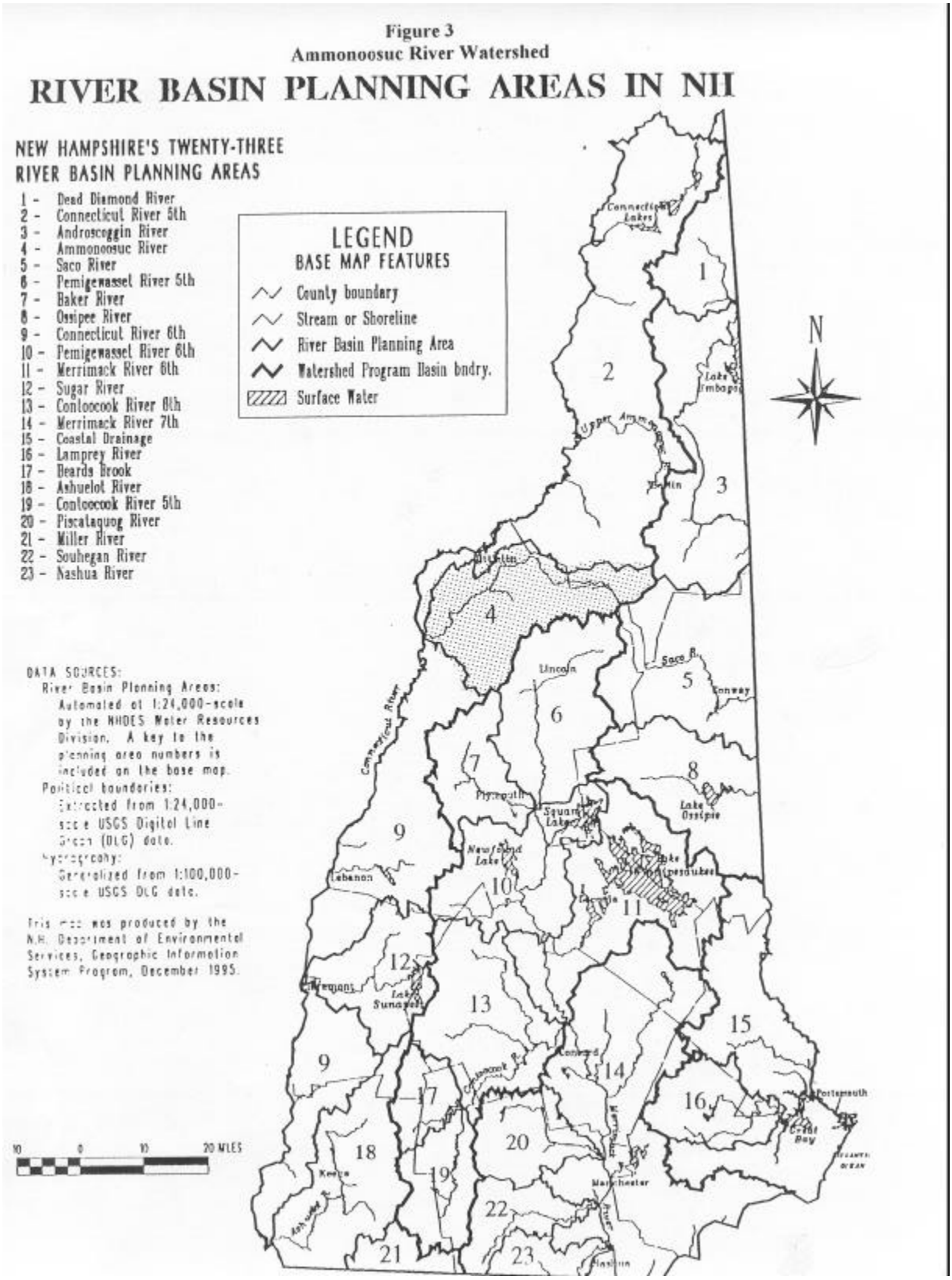


Table 7
Commercial Industrial Zoning in Study Area
Along the Ammonoosuc and Gale Rivers

Town	Stream Miles		% Zoned For High Intensity Use[1]
	Ammo	Gale	
Bath	10.49	0	14%
Bethlehem	13.11	3.33	12
Franconia	0	4.9	25
Haverhill	.48	0	100
Landaff	1.1	0	100
Lisbon	10.00	1.76	100
Littleton	7.0	0	90
Sugar Hill	0	4.0	0
Carroll	10.2	0	30

[1] Includes industrial, commercial, village, high density residential, and areas with no zoning within 250 feet of each bank.

Natural Resources

The study area is part of the Ammonoosuc River watershed, a part of the Connecticut River Basin. At its junction with the Connecticut River in Woodsville/Bath, the Ammonoosuc drains over 395 square miles. Starting on the slopes of Mt Washington, the river drains 60-miles through a narrow river valley surrounded by mountainous terrain (see Figures 4 and 5). The river is a fast flowing mountain stream with a wide fluctuation in flows. Peak flows of over 10,000 cfs have been measured at the nearest USGS gaging station in Bethlehem, while a 7-day, 10-year low flow average is only 26.9 cfs. The Ammonoosuc River is a 4th Order stream and thus comes under the rules of the NH Shoreland Protection Act. Major tributaries of the Ammonoosuc River include the Gale and Wild Ammonoosuc Rivers.

The floodplain of the Ammonoosuc River is narrow, seldom more than 1000 feet and occasionally non-existent as it winds its way to the Connecticut, depending primarily on the location of ledge outcroppings. Glacial outwash deposits are over 230 feet deep, according to a 1996 aquifer study by the US Geological Survey (10). Both Woodsville and Lisbon depend on the aquifer and/or the river for its water supply and Littleton and Bethlehem rely on surface water supplies within the watershed.

Wetlands in the study area, based on hydric soils information from the Grafton County Soil Survey (24), occupy about 10% of the study area, as shown in Table 5. By far the most dominant wetland type is forested with a poorly drained, mineral soil. While no wetland inventory or evaluation has been completed for wetlands in the study area, both Littleton and Franconia have had prime wetland studies

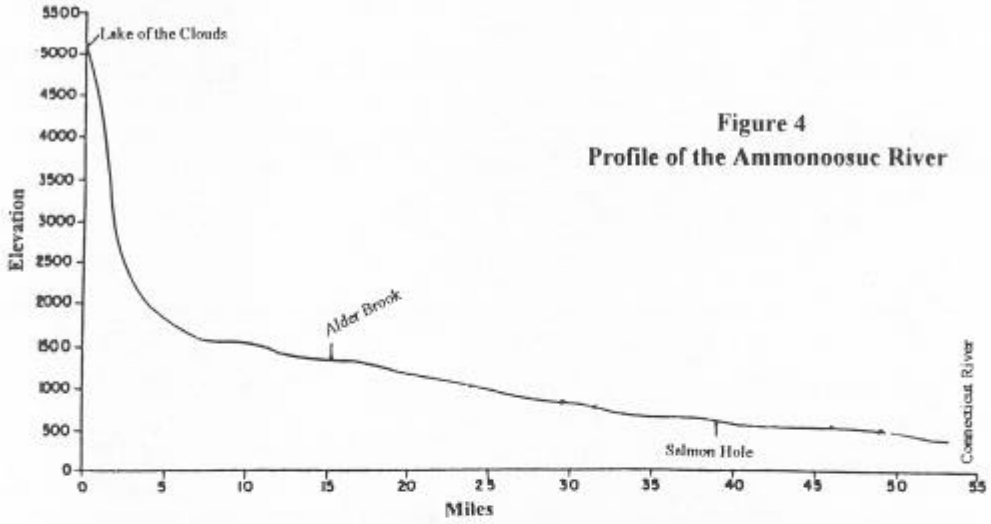


Figure 4
Profile of the Ammonoosuc River

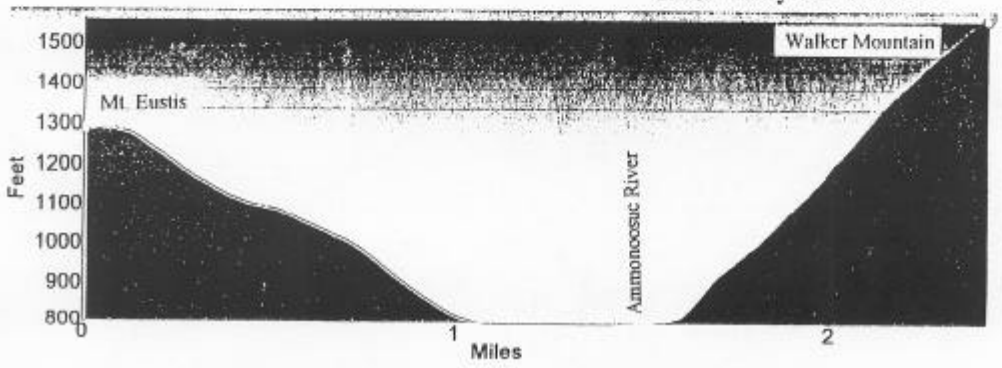


Figure 5
River Valley Cross Section

completed (12,13) and typify the area. In Littleton, 103 different wetlands were found of which 62 had only poorly drained soils. Less than 25% of the wetlands had very poorly drained organic soils. Wetlands ranged in size from less than one acre to over 180 acres. Beaver activity is common in wetlands in the area and accounts for many of the emergent and scrub shrub wetlands present.

Wetland Permitting

Impacting wetlands in the study area is regulated by federal, state, and local regulations. The most comprehensive regulatory program is that of the NH Wetlands Bureau (NHWB). RSA 482-A authorized the Department of Environmental Services (DES) to protect the State's wetlands and surface waters by requiring a permit for dredge or fill or construction of structures in wetlands or other waters of the state. RSA-482-A and the rules promulgated under that law require that projects be designed to avoid and minimize impacts to wetlands and other jurisdictional areas. The impacts that are proposed must be only those that are unavoidable. It is the responsibility of the applicant to document these considerations in the application for a permit.

According to DES rules, each project that requires a wetlands permit is classified in one of three categories according to the potential square footage impact of the project – minimum, minor, or major. Table 8 provides a summary of permitting in New Hampshire.

Table 8
Wetland Permits in New Hampshire
State and Federal
(Simplified. See agencies for detailed description of permit classification)

Wetland Impact	NH Wetlands Bureau Permit	US Army Corps of Engineers
< 3,000 sq.ft.	**Minimum Impact Permit**	**No individual application or permit**
3,000 sq.ft. to 20,000 sq.ft.	**Minor Impact Permit**	**No individual application or permit; may proceed with project 30 days after state permit if Corps does not intervene**
20,000 sq.ft. to 3 acres	**Major impact wetland permit**	**Not automatic. Most impacts over 1 acre require individual permits; may start project 30 days after state permit if Corps does not intervene via letter**
> 3 acres	**Major impact wetland permit**	**Individual permit necessary**

Many projects qualify for processing with the Minimum Impact Expedited application which may include repair and maintenance of a dock, installation of a culvert for driveway access to a single family house, or maintenance dredging of an existing pond.

Another type of project common to the North Country is wetland impacts due to logging. These projects are permitted through a notification process that must be filed at the same time as the "Intent To Cut" forms provided the operation is conducted in accordance with the publication, "Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire".

The applicant in all cases needs to explain why their proposal has less environmental impact on wetlands than other reasonable alternatives. The applicant is asked to illustrate or demonstrate why the proposal is the least impacting alternative by showing a reason or need for the project and by showing that wetland impacts have been avoided or minimized wherever possible.

In the case of major projects, applicants may be asked to propose mitigation to offset wetland loss. Mitigation is defined as "avoiding impacts, minimizing impacts, and compensating for remaining unavoidable impacts." When wetland impacts are unavoidable, "compensatory mitigation" is sometimes used after all other efforts to avoid and minimize adverse impacts have been exhausted.

In 1992, the U.S. Army Corps of Engineers issued a New Hampshire State Programmatic General Permit (NHSPGP) in order to eliminate redundancy in wetland permitting-applying for two wetland permits for the same project (see Appendix D). Under the NHSPGP, all wetland applications are reviewed on an individual basis by the NH Wetlands Bureau. The applicant files one application and federal agencies review only projects that first have received permits from the state. Projects that are approved by the NHWB and classified as minimum automatically fall under the NHSPGP with no USACE action required. Minor projects and major projects are screened by the USACE and other federal agencies for possible inclusion under the NHSPGP. The USACE notifies the applicant within 30 days if an individual permit is required. If the project meets the conditions of the NHSPGP and the USACE does not intervene in 30 days, minor projects are automatically approved. For major projects, the applicant cannot automatically begin after 30 days but must receive written notification from the USACE before proceeding. Any project impacting more than three acres of wetland always needs an individual federal permit. There are also other excluded types of projects such as boating facilities.

The NHSPGP has resulted in a dramatic decrease in the number of federal individual permits with a saving of time and money to both the applicant and the regulatory agencies. Often for major projects, the Corps regulators will work with individuals during the state permitting process to alter their project or mitigation plans in order to allow the project to proceed without the need for the lengthy and costly federal individual permit.

5. WETLAND PERMITTING IN THE STUDY AREA AND PROJECTED MITIGATION NEEDS

Table 9 and Map 1 show the location and number of wetland permits issued in the study area over the past 5 years. Table 10 breaks the total number of applications down by type. While the number of permits issued is quite high, many were for minor impact projects and logging which involve 3,000 square feet or less of impact.

Table 9
WETLAND PERMITS IN STUDY AREA
1996-2000
By Town

Town	Wetland Permits	Percent
Bath	17	8
Bethlehem	41	18
Franconia	23	10
Haverhill	16	7
Landaff	25	11
Lisbon	23	10
Littleton	61	28
Sugar Hill	17	8
Total	223	100

As seen in Table 10, only 4 projects had compensatory mitigation for a total area of about 71 acres, most of which was for the protection of upland buffers.

If a wetland bank were to be established in the study area, projecting the mitigation need would be an important first step. To project the future need, a straight-line projection of wetland impacts in the study area was made for the next ten years and the results shown in Table 10. The projected 10-year impact is 26 acres. Using an assumption that 75% of the impact will be in forested wetland and that the proposed mitigation ratios shown in Table 11 apply, the amount of mitigation, depending on type, ranges from 45.5 acres of created wetland to 325 acres of upland buffer.

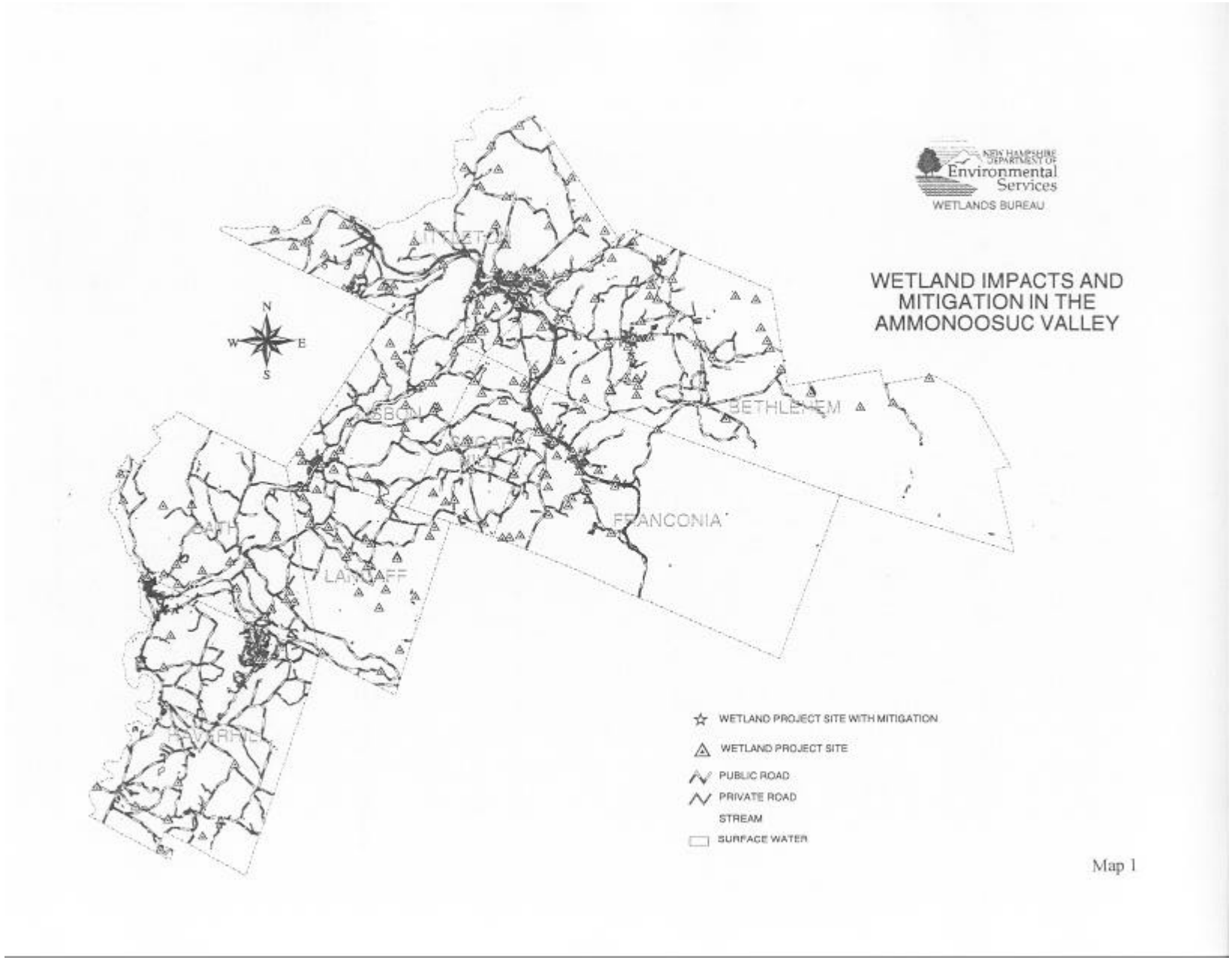

NEW HAMPSHIRE DEPARTMENT OF Environmental Services
WETLANDS BUREAU
WETLAND IMPACTS AND MITIGATION IN THE AMMONOOSUC VALLEY
N
W
E
S
BETHLEHEM
FRANCONIA
LANDAFF
WETLAND PROJECT SITE WITH MITIGATION
WETLAND PROJECT SITE
PUBLIC ROAD
PRIVATE ROAD
STREAM
SURFACE WATER
Map 1

Table 10
Study Area Wetland Impacts
(1996-2000)

Total Wetland Applications	**223**
• Major Impact	**17**
• Minor	**38**
• Minimum	**48**
• Forestry	**120**
Total Wetland Impacts*	**13.0 acres**
Surface Water Impacts	**4.4 acres**
Mitigation Area	**71.3 acres**
• Preserved Land	**68.3**
• Restored Wetland	**1.6**
• Created Wetland	**1.4**
Number of Projects with Mitigation	**4.0**

* Does not include forestry impacts. Source: NHWB, 2000

In Table 11, it is assumed that every acre of impact will have compensatory mitigation. However, realistically this will not be the case. The proposed mitigation rules require compensatory mitigation for only those projects that impact 10,000 square feet or more. It is clear that most permits granted in the North Country over the past five years are minor in nature. To account for this, a more realistic projection analysis was completed with the results shown in Table 12.

Table 11
10-YEAR PROJECTED MITIGATION NEED
TOTAL MITIGATION

Average Wetland Impact per year 1996-2000	**2.6 acres**
Projected 10 Year Impact	**26 acres**
Assume 75% Forested	**19.5 acres**
Assume 25% Other Wetland Types	**6.5 acres**
Mitigation Needed By Type (Draft Ratios) (1)	
100% Created	**49.0 acres**
100% Restored	**45.5 acres**
100% Upland Buffer (assumes 25% incorporated wetlands)	**325 acres**

1. Assumes all impacts mitigated

Table 12
Mitigation Needs For Minor and Major Projects Only

Average Wetland Impact per year 1996-2000	2.6 acres
Minus Forestry/Minimum Impact Projects (assume 1,500 sq. ft. with average 35 projects/yr.)	-1.2 acres
Net Minor and Major Impacts	1.4 acres
Projected 10 Year Impacts	14.0 acres
Assume 75% Forested	10.5 acres
Assume 25% Other Wetland Types	3.5 acres
Mitigation Needed By Type (Draft Ratios) (1)	
100% Created	26 acres
100% Restored	19 acres
100% Upland Buffer (assumes 25% incorporated wetlands)	175 acres

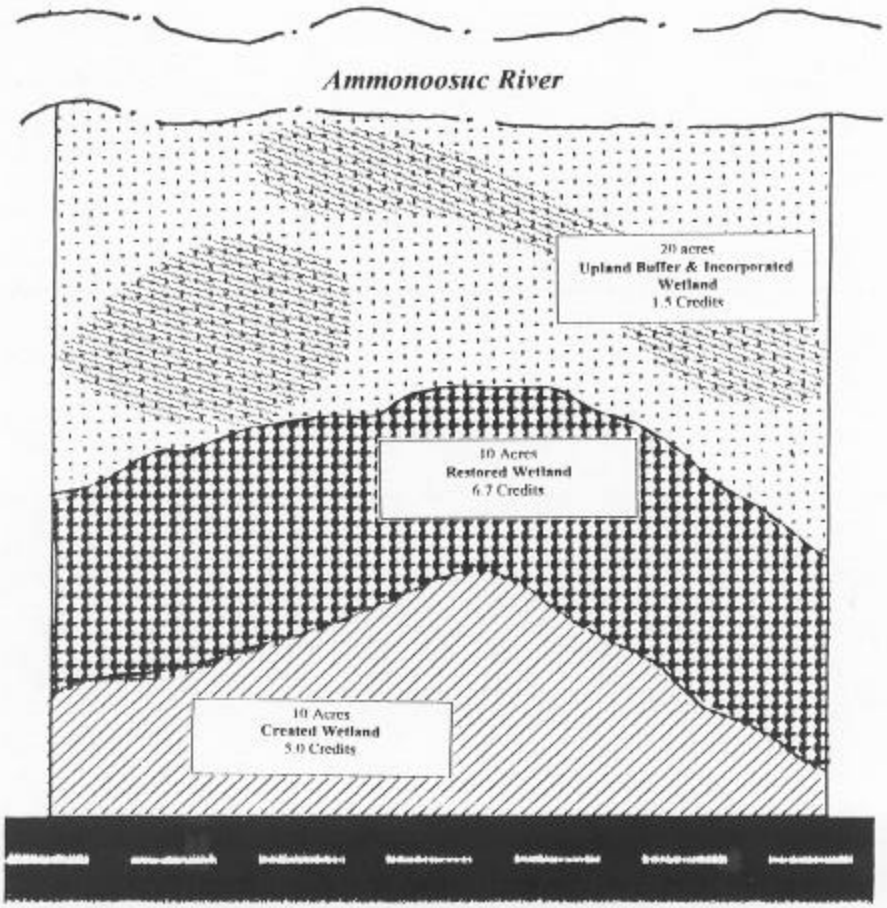
The results reduce the need for compensatory mitigation in half. Thus if a bank were to satisfy all the projected mitigation needs for major and minor impacts it would need to produce about 14 credits, with the number of actual acres needed for the bank depending on the type of mitigation provided, ranging in size form 26 to 175 acres. A bank that only provided created wetland opportunities would only have to be 26 acres in size, but would need to be 175 acres in size if only upland buffer mitigation was provided. The most likely scenario is a site which offers creation, restoration and upland buffering opportunities.

Figure 6 provides an illustration of what a bank site might look like at completion to meet the above projected need based on the NHWB draft rules (Appendix A). The 40- acre site would offer 20 acres of upland buffer, ten acres of each restored and created wetland, and thus offer 13.7 credits for forested wetlands impacts (and more for most other types of impacts).

In determining the feasibility of a bank in the area, it is unreasonable to assume that it will be used to provide the total amount of impact needed. Since any bank will have to market or "sell" its credits, it is unlikely to expect that all wetland applicants will come to the bank for mitigation. If an applicant can mitigate less expensively onsite, then they most likely will do so. Therefore, either a smaller bank would be reasonable or a longer buildout timeframe.

Figure 6

Wetland Banking Credit Calculation



Credit Calculation Example

40 Acre Parcel

10 Acres Restored Wetland (1.5: 1)	6.7 Credits
10 Acres Created Wetland (2:1)	5.0 Credits
10 Acres Upland Buffer (10:1)	1.0 Credits
10 Acres Incorporated Wetland (20:1)	0.5 Credits

Total Credit Value = 13.7 Credits for Forested Wetland Impacts

6. FINANCIAL ISSUES OF WETLAND BANKING

Operating a wetland bank has been compared to operating a farm or a cemetery. Like farming, the wetland banker markets a product on his land and has to guarantee the crop (i.e. wetland type), taking a substantial risk in doing so. Like a cemetery, there will be a number of customers involved and the land will have to be maintained in perpetuity.

As previously seen, a wetland bank can be a complex proposition with a number of variables, unknowns and players. It requires not only long term commitment and a business plan to be successful; it can also require a substantial amount of money. To be successful a bank must be able to (at least) breakeven financially if it is to meet its long term management obligations.

In order to assess the economic feasibly of a bank in the Ammonoosuc River Valley, two budget scenarios have been created below. They look at the costs of a bank from concept to completion. The banking establishment process is divided into eight phases:

1. Feasibility
2. Site Selection
3. Establishment of Bank Organization
4. Site Purchase and Planning.
5. Construction
6. Marketing and Conveying of Credits
7. Monitoring/Remedial Measures
8. Long-term Management.

In both scenarios below, 13 mitigation credits are produced, roughly estimating the need of the study are for the next 10 years. The total cost reflects the amount the banking organization would have to raise by the selling of credits in order to “breakeven”. Cost is broken down into total cost and cost per credit. Ultimately, the bank can only be economically successful if it can sell credits for the cost of creating and maintaining them.

For both scenarios the following assumptions are made:

- The NH Wetlands Bureau adopts and enforces its proposed mitigation ratio rules.
- A separate wetland banking organization is created.
- There will be no paid staff with reliance on volunteers for management/administrative duties and various agencies and consultants for technical expertise.
- No money is borrowed (i.e. no interest expense is considered).

The first scenario, shown in Table 13, is a worse case scenario. In this case, the following additional assumptions are made:

- No grants or outside income is obtained.
- The banking organization purchases a 40-acre parcel that provides 13 credits to mitigate a forested wetland impact, including creation credits (6.7), restoration credits (5.0) and upland buffer credits (assuming 25% incorporated wetland (1.5) at one banking site).

The second scenario, shown in Table 14, reflects a less expensive bank that produces the same amount of credits. In this case the assumptions are that:

- Grants are received for some components
- Land is obtained through grants, donations or easements
- The banking organization obtains a 72-acre parcel that provides 13 credits to mitigate a "other jurisdictional area" impact (see Table 1) that requires no wetland creation but 6.5 acres of restoration and 65 acres of upland buffer with 25% incorporated wetlands at one banking site.
- Restoration site is mostly agricultural land and relatively ease to restore.

The two scenarios presented offer only two of many possible scenarios. Scenario #1 illustrates a situation wherein one credit would have to be sold for $65,000 for the bank to "breakeven", while scenario #2 demonstrates the need for one credit to be sold at the rate of $11,000. The range is great, but one thing is clear- site selection is the most critical aspect of organizing an economically successful bank. In scenario #1, nearly 50% of the cost is for constructing created wetland ($400,000 for 10 acres or $80,000 per credit). If the site selected required no creation of wetland but instead developed the 13 credits of mitigation by producing 50% upland buffer and 50% wetland restoration, the budget cost of creating the credits would be reduced from over $65,000 per credit to potentially less than $11,000 per credit. The goal should be to produce the most credits at the least cost, with maximum benefit to protecting the resource. Cash flow is also important. The more credits that can be sold quickly with minimal expense, the better.

Table 13
BUDGET SCENARIO #1:

Item		Cost	Cost/credit
Phase 1: feasibility		$24,000	$1846.00
Define study area History of Wetland Impacts Projection of future needs for mitigation Wetland Banking Issues			
Phase 2: Site Selection		$30,000	$2308.00
Criteria for site Identifying possible sites/Ecological Inventory Preliminary site plan Coordination with agencies Permitting Market analysis to determine selling price			
Phase 3: Establish Wetland Bank Owners By-laws, Tax status: $1000.00 Insurance: $500 Bookkeeping, Accounting $ 500.00 Start-up staff : $00		$ 3,000	$ 230
Phase 4: Site Purchase and Development Plan		$ 51,000	$ 3,923
Purchase site (40 acres @$750 per acre)	$30,000		
Develop detailed plan for site	$15,000		
Determine number of credits	$ 3,000		
Plan construction phases	$ 3,000		
Phase 5: Plan Implementation		$612,000	$47,076
Construct created wetland: 10 acres @$40,000=$400,000 ($80,000/credit) Restored wetland: 10 acres @$20,000=$200,000 ($29,850/credit) Upland Buffer: 20 acres @$600=$12,000 ($8,000/credit)			
Phase 6: Marketing and Conveying Credits		$ 4,000	$ 307
Phase 7: Monitoring (@ $ 400 per credit per year for 3 years):		$ 15,600	$ 1,200
Subtotal		$739,600	
Phase 8: Long-term Management (@15% of subtotal cost)		$110,940	$ 8,533
TOTAL		$850,540	$65,423

Table 14

BUDGET SCENARIO #2:

Item		Actual Cost	Actual Cost/Credit	Net Cost/Credit
Phase 1: Feasibility (grant)	$24,000	$1846	$0	
Define study area History of Wetland Impacts Projection of future needs for mitigation Wetland Banking Issues				
Phase 2: Site Selection (grant)	$30,000	$2308	$0	
Criteria for site Identifying possible sites/Ecological Inventory Preliminary site plan Coordination with agencies Permitting Market Analysis to Determine selling price				
Phase 3: Establish Wetland Bank Owners (Grant)		$ 3,000	$ 230	$0
By-laws, Tax status: $1000.00 Insurance: $500 Bookkeeping, Accounting $ 500.00 Start-up staff : $00				
Phase 4: Site Purchase and Development Plan		$ 75,000	$5,769	$ 1,615
Obtain site (72 acres-Grant/Gift)	$54,000			
Develop detailed plan for site	$15,000			
Determine number of credits	$ 3,000			
Plan construction phases	$ 3,000			
Phase 5: Plan Implementation		$78,000	$6000	$6000
Restored wetland: 6.5 acres (1:1) @$6000=$39,000 ($6,000/credit) Upland Buffer: 65 acres @$600=$39,000 ($6000/credit)				
Phase 6: Marketing and Conveying Credits		$ 4,000	$ 307	$ 307
Phase 7: Monitoring (@ $ 200 per credit per year for 3 years):		$ 15,600	$ 1200	$1,200
Subtotal		$229,600		
Phase 8: Long-term Management (@10% of total cost)		$ 22,960	$ 1,706	$1,706
TOTAL COST		$252,560	$19,366	
NET COST		$141,560		$10,828

7. CONCLUSIONS AND RECOMMENDATIONS

Is A Bank Feasible?

The North Country Council, based on the research of Lobdell Associates and input of the Advisory Committee, believes that mitigation banking can provide significant environmental benefits over on-site mitigation in the Ammonoosuc River Valley. As has been shown, however, wetland banking can be complex, costly, and subject to regulator interpretation and market fickleness.

A bank would be most feasible under the following circumstances:

- The State adopts the proposed mitigation rules and requires mitigation for all projects over 10,000 square feet.

- When enforcing the new mitigation rules, the NHWB must give equal attention to on-site compensation as they do to the bank. If the bank is required to have bonds, monitoring, enforcement, long term management, etc., while on-site mitigation is haphazardly monitored and not held to the same standards, the bank will not be feasible since on-site mitigation will be substantially less expensive than obtaining bank credits. There must be a level playing field and the state will need to augment its mitigation compliance efforts.

- The NHWB and other regulatory agencies should recognize any wetland bank in the study area as a pilot bank and experimental in nature. This one of the main reasons the advisory committee felt that a private commercial bank would not be feasible-the risk and expensive of setup being too high due to the lack of standards. Requirements should not be such that they make the bank uneconomical for a non-profit in light of the increased environmental benefit. It should be understood that success could lead to other non-profit and the first private commercial bank elsewhere in New England.

- The bank should not initially try to comply with the federal guidelines for banks but focus instead on providing mitigation for state wetland permitting and those projects covered by the NHSPGP agreement. The two main reasons for this are the time, cost, and complexity of obtaining federal approval and the uncertainty of federal agencies acceptance of the use of upland buffers for mitigation purposes. However, concurrence with this approach should be obtained from all federal agencies involved before proceeding in order to not limit future opportunities.

- Wetland bank credits should be allowed to be sold at the time the permit is issued, as on-site mitigation has been allowed to proceed historically in New Hampshire. This would remove a major economic barrier to bank formation. A bank would not be economically feasible if on-site credits were given at the start while the bank had to create the credits several years in advance. Continued close monitoring and maintenance would help insure that the mitigation developed in a bank would

be environmentally successful and certainly more successful than an equal number of on-site credits scattered throughout the watershed.

- A separate non-profit banking organization will be needed in the watershed to own and manage the bank based on the advisory committee's feeling that no existing local organization would be willing to accept the risk at present.

- The bank should serve the entire Ammonoosuc River watershed in order to expand the service area as defined by the project. See Figure 2.

- Local officials within the town should be encouraged to be involved in any banking organization to provide the connection between the bank and local government.

- While the new rules require compensatory mitigation only for projects impacting more than 10,000 square feet, mitigation will most likely continue for smaller projects and violations as well. Off-site banking mitigation should also be an option for these permittees. This could mean substantially increased use in the North Country.

- Additionally, there is some flexibility in the federal rules that may allow the use of the bank in larger projects requiring individual permits on a case by case basis with the agreement of all participants.

Getting Started

Once the new mitigation rules are adopted and enforcement begins, a bank should be organized. Until applicants for a NH Wetlands permit are aware of the mitigation requirements and some on-site mitigation is developed, "selling" a bank may be difficult. However, once applicants learn how expensive and difficult on-site mitigation will be, a bank can be realized.

Section 6 outlined the major steps and financial components. The steps involved are summarized below:

1. Setup bank organization with assistance from existing or new non-profit organizations, if necessary.

2. Focus on providing mitigation for projects 3 acres or less.

3. Acquire sufficient funds for start-up.

4. Determine size and type of bank needed and inventory possible sites.

5. Develop preliminary mitigation construction plan with phases built-in.

6. Complete marketing analysis to determine cost of credits versus what will be marketable.

7. Establish "selling" price for credits including land, construction, and long-term monitoring costs.

8. Line up a potential client or two.

9. Acquire all permits, agreements, etc., (ready to go!).

10. Get the word out that bank is up and running.

Coordination with the NH Wetlands Bureau, Corps of Engineers, US Environmental Protection Agency, and US Fish and Wildlife Service will be critical and should be on going throughout the process.

Getting The Word Out

The bank will have to be advertised so that potential clients will know that it exists. As a non-profit organization, there are several ways that this can be done at little or no cost.

- Town Clerks: Every applicant has to submit their application to the Town Clerk in the town in which the project will occur.

- NH Wetlands Bureau: The Wetlands Bureau staff can be a great help by making applicants aware of the bank during pre-application meetings and telephone requests.

- Other federal, state, county and local agencies: Many groups handle requests for information about wetlands and they can direct persons to the bank.

- Wetland Consultants: Many wetland applicants, particularly the ones that are impacting over 10,000 square feet of wetland, use consultants to assist in the wetland permitting process. Most would be very supportive of a bank, having seen first hand the lack of implementation of many of the mitigation plans they have produced for on-site owner mitigation.

How The Applicant Will See The Process

Chances are many of the applicants, at least initially, will not be familiar with mitigation and will know even less about wetland banking. There will be many misconceptions; the biggest being that by purchasing mitigation credits, they can impact a wetland without first showing need, avoidance, etc.

The applicant should relate to the bank as follows:

1. Prepares NH Wetlands Bureau application addressing need avoidance, on-site mitigation, details of wetland impacts, etc.

2. Learns the extent and type of offsite compensatory mitigation that will be required.

3. Contacts the wetland bank and completes a compensatory mitigation worksheet to determine the necessary mitigation credits needed.

4. Reserves mitigation credits with bank through a deposit.

5. Finalizes wetland banking needs and receives wetland permit.

6. Pays bank in full for necessary credits including monitoring and long-term maintenance costs.

7. Bank develops necessary credits and applicant starts project.

8. Wetlands Bureau monitors project and bank to determine if permit conditions are being met.

9. Wetland bank monitors credit areas and maintains them in “perpetual care” for client.

Keeping The Costs Down

Getting the bank started financially will be the biggest hurdle. However, once those first few credits are sold, bank finances should begin to even out and improve. However until that time keep costs down by:

- Piggybacking with another, existing group until bank is solvent.

- Obtain grants to cover as many costs as possible. As a demonstration project, the potential is higher for such funds. Sources of grants may include the US Environmental Protection Agency, NH Department of Environmental Services, US Fish & Wildlife Service, NH Department of Resources and Economic Development, NH Office of State Planning and private foundations. etc.

- Engage experts in existing local, state, and federal agencies, and conservation groups to provide necessary planning and design work.

- Have a site donated or use a site that is already owned by a town or non-profit group.

- Explore the idea of having potential bank users help fund the bank setup. This might be very appealing to larger interests who see the need for multiple wetland permits over a period of years for expansions and new projects. This might include towns, school districts, industrial parks, ski areas, larger commercial or industrial interests, etc.

- Sell credits for upland buffer areas first, generating income to be used for any restoration or creation to be done on the site.

- Avoid wetland creation whenever possible because of its expense and potential for failure.

- Market credits up front and receive prepayments for future credit needs.

- Generate income during wetland creation by selling excavated material.

A bank needs also to protect itself from natural and man-made disasters, such as floods, ice jams, disease, etc. If reasonably priced insurance cannot be obtained, then regulators need to accept the risk and limit liability for replacement to the end of the monitoring period.

Potential Wetland Bank Sites

Although not a required component of this feasibility study, Lobdell Associates undertook a very preliminary investigation to identify potential bank sites in the Ammonoosuc River Valley. The investigation was based on knowledge of the river valley, existing information such as soil surveys, aquifer studies, tax maps, topography maps, flood hazard maps, etc., (see Figure 7). No on-site investigations were carried out as part of this investigation and no landowners were contacted to determine availability. The purpose of the investigation was to not only identify possible sites but to aid the Advisory Committee in its deliberations and fine tune recommendations as to what types of sites were economically and environmentally desirable in the Ammonoosuc River watershed.

Based on the research for this report relative to natural resources, development patterns and the economic realities of establishing a bank site, the following criteria for site selection have been assembled. They are broken down into two categories:

- Environmental-Site attributes that would provide the most environmental benefits and enhance wetland and surface water functions and values within the watershed.

- Economic- Site attributes that would offer the most economically feasible opportunities to develop banking credits.

Figure 7

Potential Wetland Banking Sites
Preliminary Inventory Form

Site:_____. Town:_____. USGS Quad_____.

Lat:_____. Long:_____. Elevation:_____. Approx. Size (acres): _____.

Location:_____. Tax Map/Lot Number(s)_____.

River Frontage (ft.):_____. Approximate % in Floodplain:_____.

Area in Shoreland Protection (acres):_____. Approximate % in Aquifer:_____.

Land Use:_____.

Access: _____.

Soil Mapping Units and Extent (acres)_____
_____.

Percent Upland:_____%. Percent Hydric_____%. Percent Alluvial Soil_____%.

Approximate % of Disturbed/Impacted Wetland:_____%. Describe_____
_____.

Approximate % of Disturbed Upland:_____. Describe:_____
_____.

Mitigation Opportunities and Concerns:_____
_____
_____
_____
_____
_____.

Of course, any site selected would have to meet the as of yet undetermined mitigation requirements of the NHWB and ultimately, the bank user.

Environmental

1. Site has shoreline on the Ammonoosuc or Gale Rivers

2. Site in the floodplain adjacent to the Ammonoosuc or Gale Rivers

3. Site overlays an aquifer

4. Site contains disturbed land and/or disturbed wetland

5. Site exhibiting or has potential for an unstable streambank

6. Site with at least some upland

7. Site near or adjacent to existing conservation land

8. Site with potential to enhance wildlife, water quality, flood control, educational and aesthetic values

Economic

1. Site that has upland buffers and incorporated wetlands.

2. Site that has wetland that can be restored economically.

3. Site that has upland that allows economical wetland creation, such and somewhat and moderately well drained soils.

4. Site that is in the floodplain which can offer both wetland and flood mitigation.

5. Site that has easy access.

6. Site with expansion potential.

7. Site that can be obtained at little or no cost.

Basically, sites were sought that were adjacent to and had frontage on either the Ammonoosuc or Gale Rivers and in their floodplain and identified aquifers. With regard to land use, sites were selected that were disturbed in some way, such as excavation, erosion, or agriculture. Sites that had some hydric

(wetland) soils or were adjacent to hydric soils were favored and that had moderately well drained soils that could be inexpensively used for wetland creation due to a naturally high seasonal watertable.

Several sites have experienced ice jam and related flooding problems in the past. Such an event could damage a recently established wetland bank. However, since ice jams locations and impacts are unpredictable, historic evidence of their occurrence is the only reliable indicator.

One important factor to consider is that some of these sites contain active farmland and some prime agricultural soils. The loss of prime agricultural land to create a wetland bank was of concern to some members of the advisory committee and thus idle and less valuable agricultural is preferred over prime agricultural land that is in production.

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Glossary

Banking Instrument: Document drafted by the bank sponsor to describe, in detail, the physical and legal characteristics of the bank, and how the bank will be established and operated.

Bank Sponsor: Any public or private entity responsible for the successful establishment and, in most circumstances, operation of a mitigation bank.

Compensation Requirement: The type and number of acres/required mitigation credits of wetland impacted by a project for which compensation is required.

Creation: The transformation of upland to wetland at a site where the upland was not created by human activity such filling or water diversion.

Compensatory Mitigation: An effort to offset the impact of a project by replacement or partial replacement of wetlands functions and values lost, or by substituting the value added to a wetland or wetland system. Compensatory mitigation can include creation of a new wetland, restoration of a wetland, or preservation of land.

Credit: A unit measure representing the accrual or attainment of aquatic functions at a mitigation bank. Credit measurements may be in the form of acres of wetlands, habitat units or other functional units.

Debit: A unit measure representing the loss of aquatic functions due to a construction activity at an impact or project site. In a given bank, debit units must be in the same form as credit units and be determined using the same assessment method.

Conservation Area: The land for which a legal agreement that restricts the future use of the property in perpetuity, exists between the landowner and a conservation organization or a political subdivision of the State of New Hampshire.

Contiguous Jurisdictional Area: means a wetland or surface water that is either entirely surrounded by a preserved upland buffer or has those portions under a single ownership surrounded by a preserved buffer.

Degraded Wetland: A wetland that no longer provides the full range of its natural functions and values, due to man-made alterations or disturbances, such as invasion by exotic species, siltation, pollution, deposit of fill or refuse, or changes in hydrology. Enhancement alteration of an existing wetland to increase specific functions (e.g., flooding a freshwater marsh to create a pond that will provide greater habitat for waterfowl).

Entrepreneurial banks: A mitigation bank established by a landowner and/or investor(s), in which the credits are sold on the open market to compensate for wetland losses.

Enhancement: Activities conducted in existing wetlands or other aquatic resources to achieve specific management objectives or provide conditions which previously did not exist, and which increase one or

more aquatic functions. Enhancement may involve trade-offs between aquatic resource, functions, and values; a positive change in one function may result in negative effects to other functions.

Exchange ratio: The ratio of the number of acres of created, restored, or enhanced wetlands that can be exchanged for a certain number of acres of wetlands lost to development. For example, if ten acres of created wetlands are required to compensate for the loss of five acres of natural wetlands the exchange ratio is 2:1.

Function: Any number of physical or biological processes performed by wetlands. Commonly recognized functions are food chain production, provision of fish and wildlife habitat, shoreline protection, storm and floodwater storage, groundwater recharge and discharge, and water quality maintenance.

In-Kind Replacement: Replacing one type of wetland with another of the same type and condition, for example, compensating for the loss of a forested wetland by creating or restoring a physically and biologically similar forested wetland.

In-Kind Compensation: The replacement of a specific wetland type with the same wetland type. Type is defined by the U.S. Fish and Wildlife Service's Cowardin et. al. (1979) Wetlands Classification System. Intermittent stream - a stream that flows for sufficient time to develop and maintain a scoured channel, but which might not flow during dry portions of the year.

Mitigation: The three step process outlined in the 404(b)(1) Guidelines: first, avoid adverse impacts associated with a proposed project through selection of less damaging practicable on-site or off-site alternatives; then minimize the impact of the selected alternative to the extent appropriate and practicable; and finally, compensate for remaining unavoidable impacts to the extent appropriate and practicable.

Mitigation Bank Review Team (MBRT): The interagency group of Federal, State, tribal, and local regulatory and resource agency representatives that are party to a banking instrument and oversee establishment, use and operation of a mitigation bank.

Mitigation bank: The creation, restoration, or enhancement of wetlands that will be sold or exchanged to compensate for future wetland losses. Typically, the created, restored, or enhanced wetlands are designated as a bank. The value of the wetlands created, restored, or enhanced are somehow quantified and assigned credits, which can be sold or "withdrawn" to compensate for the loss of wetlands or wildlife habitat elsewhere.

Mitigation credits: A unit of measure of the increase in wetland functional value achieved at a mitigation site, and therefore a unit of exchange for compensatory mitigation.

No net loss: The point at which wetland losses equal wetland gains (i.e., ten acres of wetlands created to compensate for the loss of ten acres).

Off-site: Not on the same parcel of land as a wetland that has been adversely affected by a particular development.

Out-of-kind replacement: Compensating for the loss of one type of wetland by creating or restoring a wetland of a different kind or type (e.g., re- placing the loss of a bottomland hardwood swamp with an estuarine marsh).

On-site: For purposes of searching for on-site mitigation, a location adjacent or contiguous to a discharge site.

Operation: The actual conduct of credit withdrawal transactions in a functioning wetland mitigation bank in order to compensate for unavoidable wetland losses. Operation also includes activities such as monitoring, remediation, etc.

Out of Kind Compensation: Replacement of a specific wetland type with wetlands of another type. Practicable" means availability and feasibility of an option considering cost, existing technology, and logistics based on the over all-purpose of the project.

Perennial stream: A watercourse that flows throughout the year or nearly so in a well defined channel.

Restoration: The re-establishment of filled or degraded wetlands to a condition which more closely reflects their historic status and which results in greater wetland acreage or functions and values.

Shoreline frontage: The average of two distances: the actual natural navigable shoreline footage and a straight line drawn between property lines, both of which are measured at the normal high water line.

Single-user bank: A mitigation bank (see earlier definition) established by one company or agency, such as an oil company or a port authority, from which it can later withdraw credits to compensate for future wetland losses resulting from its own projects.

Service Area: Based on hydrologic, edaphic and biotic criteria, the designated area (e.g. watershed or ecoregion) wherein a bank can reasonably be expected to provide appropriate compensation for adverse impacts to wetlands and/or aquatic resources.

Wetlands: Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. For the purposes of this report, the U.S. Army Corps of Engineers 1987 "Jurisdictional Wetland Delineation Manual," will be used to identify wetlands.

Appendixes

A. Draft NH Wetlands Bureau Mitigation Rules

B. Federal Mitigation Banking Guidance

D. USA Corps of Engineers/State of NH Programmatic General Permit